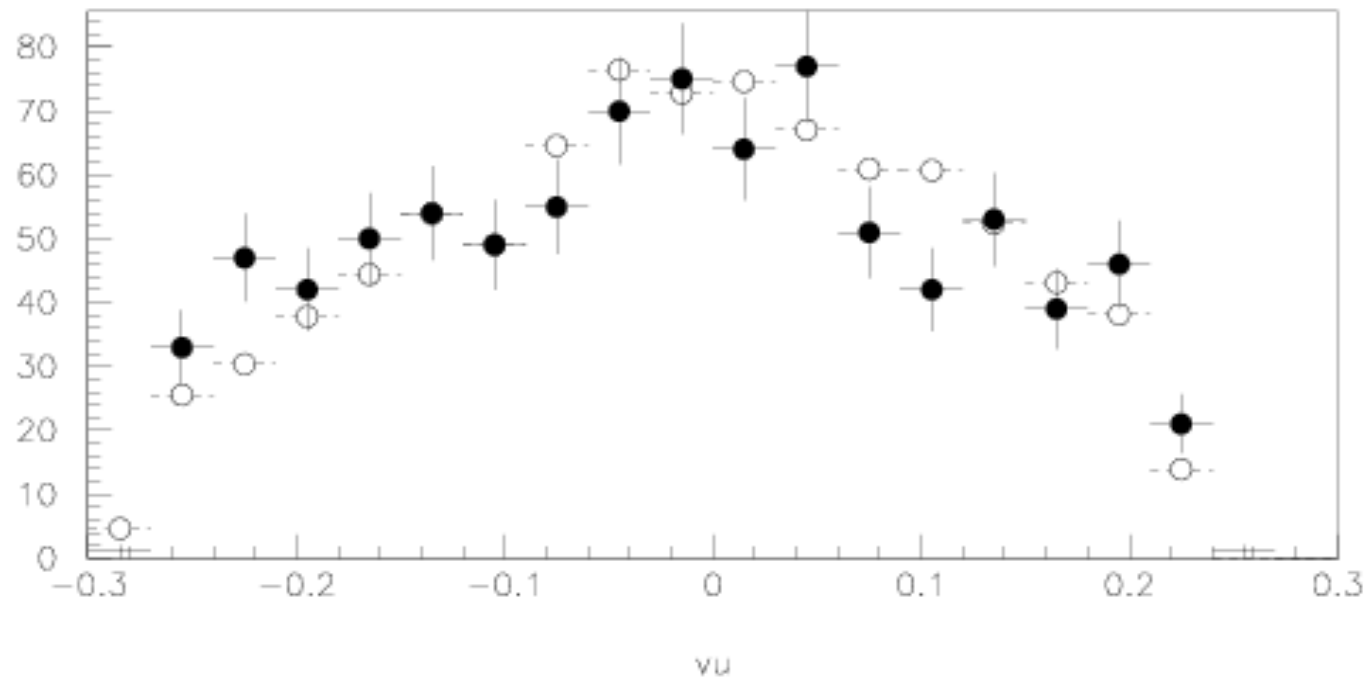# Neutrino Beam at the Target

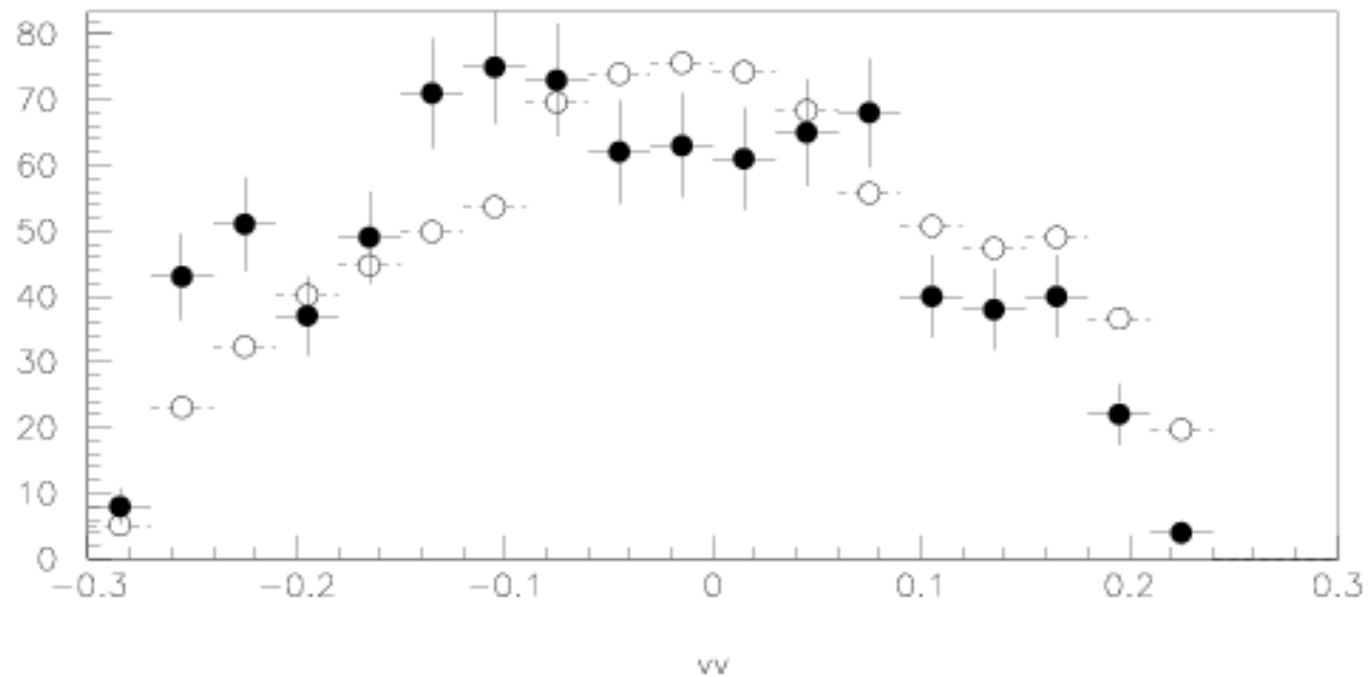Bruce Baller

December 10, 2005

Compare Data/MC Vertex Position

- Use all 870 data neutrino events
- Use all located events in E872 MC

- Emulsion target centers are located 4.1 cm above "beam height"
  - Error in SFT stand construction
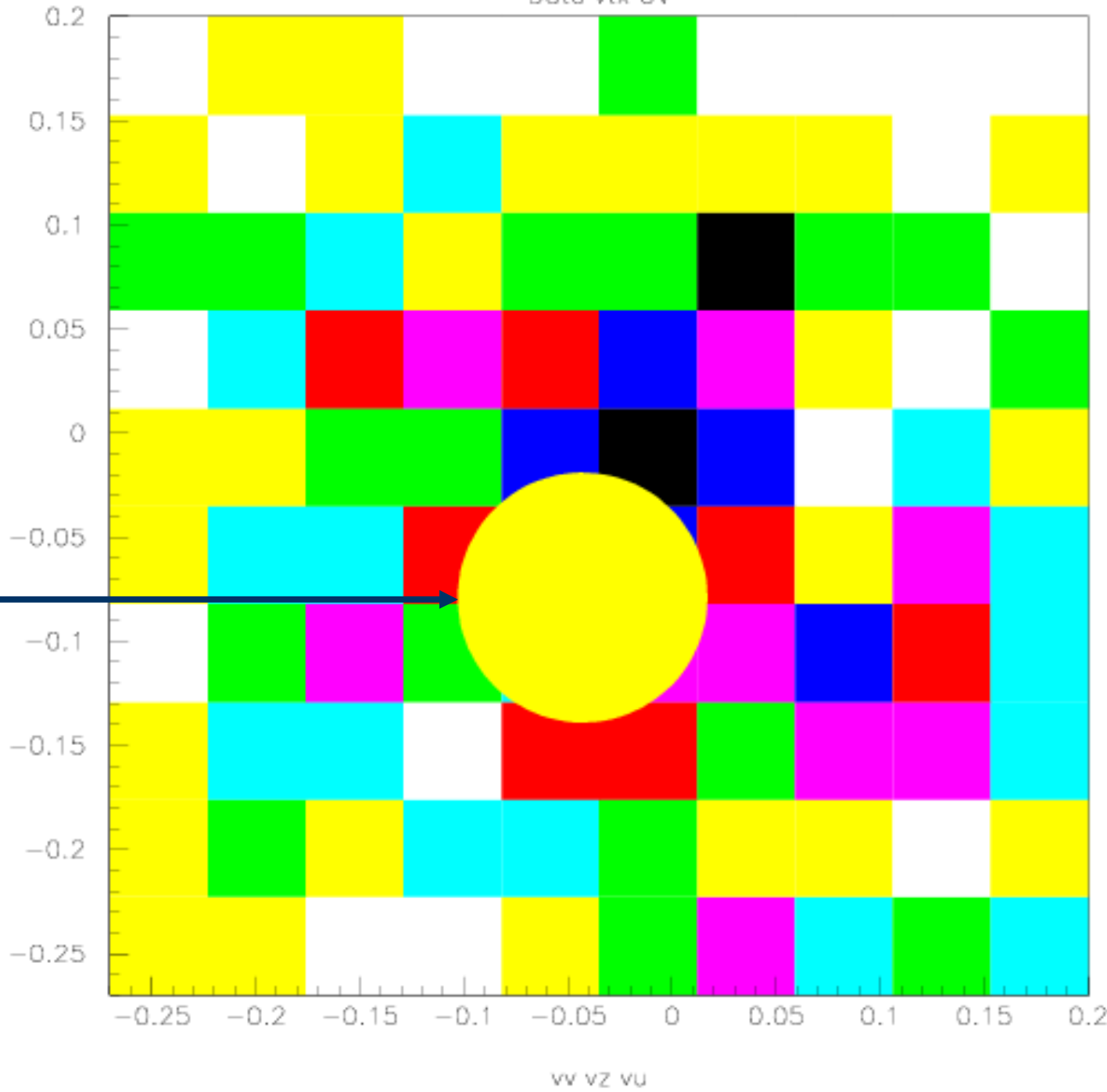 - Included in MC geometry

Solid: Data

Open: MC

Average data vertex position is shifted to –U, -V

Determine ν beam position at tgt

- Assume beam shape is a 2 dimensional gaussian
  - $R^2 = ((U-U_c)^2 + (V-V_c)^2)$
  - $N(U,V) = A * \exp(-0.5*R^2/\alpha)$
- Fit 2D histogram for U_c, V_c, A, α
- Fit results
  - U_c = -0.04 +- 0.02   → X_c = -0.03 +- 0.02
  - V_c = -0.08 +- 0.02   → Y_c = -0.08 +- 0.02

Data vtx UV

3σ error
ellipse

vv vz vu

Summary

- Possible sources
  - Trigger?
    - No - T1, T2 efficiency is 98%
  - Offline event selection?
    - Unlikely
  - Neutrino beam angle? Possibly
    - Equivalent to a vertical +2 mrad proton beam angle
- Can easily include this in the MC
  - If the effect is due to the beam angle